Saskatchewan Ministry of Agriculture

CROP PRODUCTION NEWS

Volume 30, No. 9 **September 26, 2008**

PRODUCTION

CROP PRODUCTION

Editor's Comments

By Ray McVicar, Crop Development Branch (ray.mcvicar@gov.sk.ca)

This is the last edition of the 2008 Crop Production News. We would like to receive your feedback to determine if the Crop Production News is meeting your needs when it comes to crop pest and production issues, and to plan for next year. Please fill out this short questionnaire below. Respond either by copying, completing and sending it by email (ray.mcvicar@gov.sk.ca); or by printing and completing the survey, and faxing it to (306) 787-0428.

What articles did you find of most benefit during the 2008 growing season?

- □ Provincial Crop Protection Lab updates
- □ Insect updates, surveys and forecast
- □ Plant disease updates
- □ Weed identification and control
- □ Forage production
- □ Pesticide registrations / safety
- □ Soil / fertility issues
- □ Stubble management
- □ Highlight new crops
- □ Pulse / Cereal / Oilseed production
- □ Other: _____

What other production / pest issues should we provide information on next year?

Thank you for your participation with this survey and the 2008 Crop Production News!

Saskatchewan Agriculture's *Crop Report* for the week ending Sept. 21 provides details about harvest progress across the province. Visit the website at www.agriculture.gov.sk.ca/Crop-Report.

NOTE: Throughout this document, you will see that some publications are in blue font and underlined, indicating links to website information. If you are reading this off your computer screen, press the CTRL button and click your cursor on the link to take you directly to the website. ✪

Crop Production News is a biweekly publication prepared primarily by provincial specialists with the Crop Development Branch of the Saskatchewan Ministry of Agriculture. The newsletter includes a compilation of articles related to entomology, plant pathology, weed science, soils and agronomy issues.

Please do not use any of these articles for any other purpose without first asking the author's permission.

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Crop Protection Lab Update

By Grant Holzgang, Supervisor, Crop Protection Laboratory

With the growing season winding down most submissions to the Lab are related to pests that were noticed during harvest or are related to harvest quality and storage.

Figure 1: Sooty mold on wheat. Source: Saskatchewan Agriculture

Sooty molds in crops are common. Sooty molds are secondary pathogens that colonize crop tissues as they mature (Figure 1). Most farmers recognize them as the grayish dust that rises from the crop or settles on the combine. The dust is actually the spores of the fungi. The incidence increases if there has been rain as the crop reaches maturity. The two main causal fungi are *Alternaria* and *Cladosporium* species, but there are many other possibilities. They have no impact on yield, but can reduce quality in some crops.

Chocolate spot (*Botrytis cinerea*) of faba bean has been confirmed in northwest Saskatchewan. This disease can advance rapidly under wet conditions.

Pink rot (*Phytophthora erythroseptica*) of potato has been identified. The disease becomes a storage issue although the source is from the field. Wet conditions late in the growing season favor its development. Bacterial soft rot (*Erwinia caratovora*) of potato, which is favored by the same environmental conditions as pink rot, has also been seen.

Poplar production for fibre and ethanol is a new agricultural endeavor. We have been examining materials from several different stool beds (plantings of poplar from which cuttings are taken for planting).

The most common poplar pathogen isolated is *Marssonina*, that causes a leaf/twig blight. *Septoria musiva*, that also causes leaf/twig blight, has been isolated from a few sites. It is considered to be one of the most significant diseases affecting poplar production. Its cankers can girdle stems or act as a pathway for other canker fungi such as *Cytospora*. Disease severity in 2008 samples is lower than last year when we saw many completely girdled stems.

Processing of the Fusarium head blight survey material is continuing in the Lab. So far the incidence of *F. graminearum* appears to be relatively low and primarily in the southeast. ✿

Pesticide Risk Reduction Program with Agriculture and Agri-Food Canada

By Ray McVicar, Crop Development Branch

Crop protection products in Canada are regulated by Health Canada through the Pest Management Regulatory Agency (PMRA). PMRA's primary objective is to prevent unacceptable risks to people and the environment from the use of pest control products. Prior to sale or use in Canada, all pesticides must be registered. Product registration in Canada is very rigorous, costly and commonly takes many years to achieve. Canada has one of the most rigorous pest control product registration systems in the world. For more information about the pesticide registration system in Canada check out the PMRA Website at www.pmra-arla.gc.ca/english/index-e.html

Agriculture and Agri-Food Canada's (AAFC) Pest Management Centre in Ottawa also delivers programs that help to provide safer food for Canadians while encouraging environmental stewardship among Canada's producers.

The Pest Management Centre programs include the Minor Use Research Program, which conducts research to support the introduction of reduced risk minor use pesticides, and the Pesticide Risk Reduction Program. The Pest Management Centre website is: www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1176486531148&lang=e. These programs are geared to providing growers with newer, safer pesticides, and production practices that reduce reliance on pesticides.

The Pesticide Risk Reduction Program works to reduce the risks from pesticides used in agriculture. These include risks to applicators and consumers, risks to non-target organisms, and risks to air, water and soil. It focuses on selected crops and priority pest issues determined by growers, researchers, extension specialists and others.

Some examples of the current priority issues and projects are:

- Canola
    - The Prairie-wide insect monitoring network for flea beetle, diamond back moth, and Bertha armyworm; and
    - Cross-commodity sclerotinia initiative (canola, sunflower, pulses, soybean).
- Pulse
    - Chickpea - ascochyta blight sentinel plants;
    - Dry Bean - white mold; and
    - Lentil - grasshopper identification and control methods.
- Potato
    - Bacterial ring rot, common scab, silver scurf, and wireworm.

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Pesticide Risk Reduction Program with Agriculture and Agri-Food Canada
(Continued from page 3)

The Pesticide Risk Reduction program also provides information on new and innovative ways to control pests to reduce reliance on pesticides. Two examples are: *Weed Management Options Which Reduce Pesticide Risk*, and *European Corn Borer Crusher for Potatoes* (Figure 1).

Figure 1: Corn borer crusher for potato.
Source: Pest Management Centre

This information and many other publications are available in the Pest Management Centre publications and document archive at:
www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1176728972381&lang=e ✿

Clubroot – A Threat Far Beyond Canola!

By Venkata Vakulabharanam, Provincial Specialist, Oilseed Crops

Clubroot is a very serious destructive disease in cruciferous crops in many parts of the world. In Eastern Canada and British Columbia, clubroot is a serious problem in cabbage, cauliflower, radish and rutabaga. In 2003, clubroot was discovered near Edmonton, Alta. The disease has spread to other parts of Alberta, including a report at Lethbridge this year.

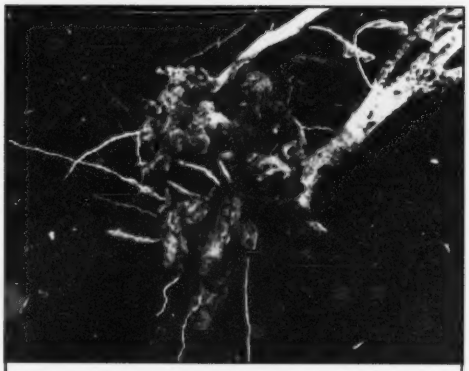

Figure 1: Canola roots infected with clubroot (disease nursery in Alberta).
Source: Saskatchewan Agriculture

Clubroot spreads through resting spores in the soil or in canola plant material containing galls. Resting spores are most likely spread via contaminated soil carried from field to field by equipment. The risk of spreading clubroot through contaminated seed or plant material is much lower.

It would likely take a few years to build up this pathogen in new fields from earth tag on seed from infected fields. However, resting spores are extremely long lived, surviving in soil for up to 20 years. It is worthwhile to note that severe canola field infestations in Alberta have caused total yield loss.

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Clubroot – A threat far beyond Canola!
(Continued from page 4)

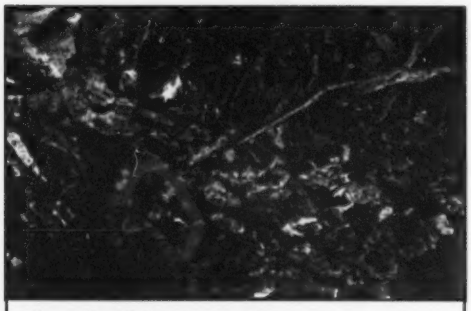

Figure 2: Clubroot symptoms on mustard roots (disease nursery in Alberta)
Source: Saskatchewan Agriculture

Clubroot can also infect camelina and mustard, but, in traditional mustard and camelina growing areas, where conditions are generally dry, risk from clubroot is very low. So far, clubroot has not been found in commercial fields in Alberta with either of these crops. However, in a disease nursery under favourable conditions, they were equally susceptible to clubroot.

Clubroot has the potential to limit crop rotations containing canola, mustard or camelina.

Some best management practices for prevention include:

1. Use long rotation breaks between canola crops. Although it will not prevent the introduction of clubroot into clean fields, it will restrict the disease development within the field.
2. Practice good sanitation to restrict the movement of potentially contaminated soil. If you are buying used farm equipment from Alberta, learn its origin and clean it thoroughly.
3. Avoid the use of straw, hay or greenfeed, silage and manure from infested or suspicious areas. Clubroot may survive through the digestive tracts of livestock.

Figure 3: Clubroot symptoms on camelina roots (disease nursery in Alberta)
Source: Saskatchewan Agriculture

4. Avoid common untreated seed, including canola, cereals and pulses. Earthtag on seed from infested fields could introduce resting spores to clean fields.
5. Scout canola fields regularly and carefully. If you have noticed symptoms of wilting, stunting, yellowing and premature ripening in any parts of your canola field, check the roots.

Prevention is always better than the cure. The longer we keep clubroot away from our Saskatchewan fields, the more crop rotation choices we will have. ✿

Saskatchewan Hay and Forage Seed Production in 2008

By Michel Tremblay, Provincial Specialist, Forage Crops

Although there were few reports of winterkill and blackstem last spring, the Saskatchewan forage crop got off to a slow start in 2008. Cool temperatures and dry conditions delayed the initiation of forage crop growth and slowed development. Forage crops need adequate moisture in early to late spring for successful development. The dry conditions in many areas last fall, combined with little rainfall in most districts until the end of June lowered production (Table 1). Improved temperatures and rains in June and July were too late for the first cut to recover completely. Older fields showed the greatest reduction in yields.

Table 1: 2008 Regional hay yields, Saskatchewan.

Region	Hay yield (tons/acre)
South East	1.03
South West	1.14
East Central	1.34
West Central	0.86
North East	1.39
North West	1.06
2008 Average	**1.13**
Provincial Average (5 year)	1.39

Source: Saskatchewan Agriculture Crop Report

Due to poor growing conditions in spring, many producers delayed cutting until July. Advanced maturity and, in some cases, rain damage due to showers in July resulted in reduced hay quality. Due to late cutting, regrowth on hay fields was delayed. Many hay fields had less than one ton per acre regrowth in mid-August. Most growers did not take the second cut, due to low yield and the risk of damaging their alfalfa by cutting during the fall critical period.

Hay prices remained in the $80-$90 per ton range during the summer, with trucking costs and pressure on cattle prices governing increases, despite below average production. Supplies of feed have tightened in 2008, due to reduced supplies of hay in Saskatchewan and surrounding areas. Comparatively good harvest weather and the lack of early fall frost means there will likely be less lower-grade grain available for the feed market.

Moisture conditions on hay and pasture remain adequate in most areas. The most recent *Hay and Pasture Topsoil Moisture Conditions Map* is included in the *Crop Report* and is available on the Saskatchewan Agriculture website at: www.agriculture.gov.sk.ca/Crop-Report.

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Saskatchewan Hay and Forage Seed Production in 2008

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Forage seed production was variable in 2008. Yields were approximately average to above average, with increasing prices for most species. Yields and prices at time of writing are included in Table 2.

Table 2: 2008 (September) Forage Seed Yields, Prices and Trends, Saskatchewan

Species	Yield Range (lb per acre)	Price $ per lb*	Comments	Acreage Trend
alfalfa	Not harvested yet	1.35-1.40		
red clover	350 lb/ac	1.05 single cut 1.30+ double cut		
alsike clover	No acres in 2008	0.55-60		
sweet clover	400-500	0.45-50		
birdsfoot trefoil	250	2.00		
timothy	300	0.50 0.60-0.80 (pedigreed)		
meadow fescue	400	0.70		
meadow brome	400-500	1.50+ 1.70 (pedigreed)		up
smooth brome	250-300	0.60-0.80		down
crested wheatgrass	300-400	0.80-1.50 (pedigreed)		
intermediate wheatgrass	250-300	0.80		
slender wheatgrass	Average 300	0.60-0.70		
western wheatgrass	-	< 2.00	big USA crop	usage down
Russian wild rye	0-100	2.00		
annual, perennial rye grass	annual 600-700 perennial 400-700	annual 0.25 -0.30 perennial 0.60	annual acres down	
creeping red fescue	No acres in 2008	0.65		

*** common seed, price to grower, unless otherwise noted**

Source: Michel Tremblay, Saskatchewan Agriculture

Information for seeding forage crops in the fall is available in the *Saskatchewan Forage Crop Production Guide* on the Saskatchewan Agriculture website at: www.agriculture.gov.sk.ca/Forage-Crop-Production-Guide. ✿

Orchard Site Selection and Fall Planning

By Forrest Scharf, Provincial Specialist, Fruit Crops

In commercial Saskatchewan fruit orchards, growers typically plant from 700 to 1,000 seedlings per acre. Seedlings cost from $2 to $6 per plant, so establishment costs are high. Fruit species have an average life expectancy from 25-35 years. So, determining whether or not a proposed orchard location is suitable is extremely important before purchasing plants and preparing the site. Site suitability is evaluated according to climatic factors, topography, shelter, water quality/availability, marketing features and soil characteristics.

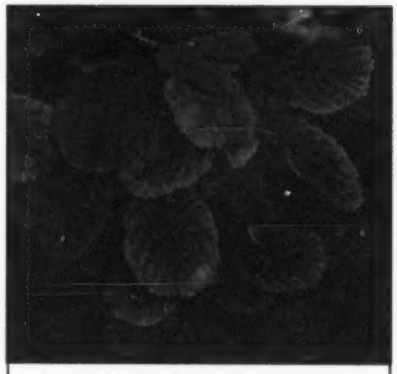

Figure 1: Iron Chlorosis
Source: Saskatchewan Agriculture

A major factor that is often not given enough consideration is the soil pH and its affect on plant nutrient availability. Most plant species are best able to absorb nutrients when the soil pH is relatively neutral. This is because the nutrients that are held to clay particles or soil organic matter are more soluble at neutral pH.

In high pH soils, a nutrient deficiency known as iron chlorosis (Figure 1) commonly occurs. It accounted for roughly half of the orchard health inquiries that were received in 2008. Iron is usually absorbed by plants in the form of Fe^{2+} (ferrous) or Fe^{3+} (ferric) ions. However, in high pH soils, iron tends to form insoluble hydrous oxides ($Fe_2O_3 \bullet 3H_2O$) that plants cannot absorb. Deficiency symptoms include interveinal yellowing especially on new growth, while the veins remain green. Leaf yellowing can occur in the older leaf tissues too, but the symptoms usually occur on new leaves first. Iron is needed by plants because it is an essential component of many redox enzymes and is required for the synthesis of chlorophyll and the capture of the sun's energy. The production of this photosynthetic energy is necessary for general plant health, so iron chlorosis results in plants becoming susceptible to winter kill, diseases and reduced fruit yield.

To prevent iron chlorosis, it is often recommended that producers apply acidic peat or sulphur to the soil to amend the pH. However, Saskatchewan's high pH soils usually have a high buffering capacity, and these treatments do not bring the pH down enough to improve the condition. Foliar sprays of chelated iron are used to effectively treat the symptoms, but the iron chelates need to be applied from three to eight times at seven- to 14-day intervals over the course of the summer, making them costly and time consuming.

There are differences in cultivar susceptibility, so in problem soils it is a good idea to consult with local growers about suitable varieties. More screening of strawberries, cherries, saskatoons and haskap is needed to select for high pH tolerant cultivars. Nevertheless, soil tests are relatively inexpensive and help identify limiting factors that may make fruit production difficult. Always do a soil test to identify the best location for an orchard. Water tests are also recommended, because calcium carbonates in the water can also make iron and other nutrients unavailable. ✿

Fall Weed Control

By Clark Brenzil, Provincial Specialist, Weed Control

Fall is a good time to begin the process of crop management for next year. With only a light frost in some areas of the province to date, leaf tissue on perennial weeds should be in ideal shape for treatment.

This should be good news for those applying *PrePass* to control dandelion after harvest. Research at the University of Saskatchewan has shown that fall application produces the best yield response of any application timing. Research found that glyphosate at 360 grams acid equivalent (gae) per acre, glyphosate at 180 gae per acre plus *Express SG* at six grams product per acre and *PrePass* all performed well when applied in late September. Although the label for *Express SG* does not specifically refer to fall application, it is registered for use on fallow. *Express* plus glyphosate may have a fit as long as it is only used prior to cereals, canaryseed, field pea, dry bean, fababean, soybean and lupin. *PrePass* may only be used in the fall prior to seeding cereals the following spring, and glyphosate has no restrictions for planting. With some residual activity from the florasulam component, *PrePass* may keep broadleaf winter annuals in check as well.

The old standby for controlling winter annuals in the fall is four ounces per acre (113 gae per acre) of 2,4-D. This is most effective if applied from about Thanksgiving weekend until freeze-up. In research, applications of 2,4-D one day prior to daytime temperatures dropping below zero degrees Celcius (C) showed effective control of winter annuals in the mustard family. Most pulse crops will tolerate this rate of 2,4-D applied in the fall, but flax, canola and mustard are risky to plant following fall 2,4-D.

Beware 2,4-D applications on narrow-leaved hawk's-beard rosettes in late fall. High rates (12 to 16 ounces per acre or 340 to 453 gae per acre) are required for good control. A fall 2,4-D application that does not completely control narrow-leaved hawk's-beard will likely compromise the activity of a spring glyphosate application.

Early application of glyphosate in the spring is also important in managing hawk's-beard. Small rosettes are susceptible to glyphosate at 180 gae per acre whereas 270 to 360 gae per acre may be required to control plants that are in the pre-bolt to bolting stage.

Cleavers have been a hot topic over the past few weeks. Are cleavers populations changing? Cleavers, black medic and field violet are annual species that can germinate in the fall when moisture is sufficient. They can survive if the winter is mild or snow cover comes early and remains throughout the winter, but die if exposed to temperatures much below -10 C. Will a fall treatment control these populations more effectively? If one could predict if these tender winter annuals will survive the winter, then an application might be warranted. But fall applications are unnecessary if winter conditions kill the plants, and cleavers and black medic are easily controlled in early spring with glyphosate at 180 to 270 gae per acre.

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Fall Weed Control
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Here is a caution about using a combination of glyphosate and rapid contact herbicides such as bromoxynil tank mixes and *CleanStart*. Studies on these mixes have found that they are less effective for the control of plants with large root or stem reserves, such as winter annual or perennial plants. The rapid death of the leaf tissues caused by the contact herbicide inhibits the movement of glyphosate, reducing its level of control. ✿

Insect Review of 2008

By Scott Hartley, Provincial Specialist, Insects and Vertebrate Pests

Climatic conditions are a major factor influencing insect populations, including pest and beneficial species. For instance, cool temperatures this spring slowed development and activity of many insects, while minimal precipitation in May resulted in the delay of wheat midge emergence in July. Economic thresholds, the estimated level at which insect populations cause sufficient damage to warrant control, were lower in 2008 because of the increased commodity prices.

Flea beetle populations have been increasing during the last few years, but we did not have the consistent warm and dry conditions in 2008 required to make them a major issue for producers.

Wireworms caused serious damage to crops in isolated areas. There are no reliable counter measures for wireworm control during the growing season and producers who experienced significant infestations during 2008 should be prepared to use an insecticide seed treatment in 2009.

Cutworms were a serious insect pest in many crops including lentil, mustard, canola and cereals and were prevalent in areas similar to 2007. Cutworms were reported throughout the south (Assiniboia), southwest (Shaunavon) and west central (Kindersley) regions. The earliest reports were species that over-winter as larvae, in most cases army and dingy cutworms that are above-ground feeders. Large infestations completely defoliated young seedling crops, typically on hilltops and drier areas of a field. Below-ground feeding species such as red-backed or pale western cutworms were also identified. Cooler, wetter conditions in some areas may have reduced the overall damage.

The **pea leaf weevil** reached economic levels in pea crops in southwest Saskatchewan in 2008. It was first found in the province in 2007, with the most extensive damage noted near the Alberta border north of Maple Creek. However, the economic infestation range extended in 2008 and chemical control was required in pea crops much further east; to the Gull Lake and Shaunavon areas. Adult feeding on the leaves can severely reduce crop stands, but larval damage to the nitrogen-fixing nodules may be more significant. Research on the pea leaf weevil is currently being conducted by Agriculture and Agri-Food Canada at Lethbridge.
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Insect Review of 2008
(Continued from page 10)

The **cabbage seedpod weevil** has continued to expand out of southwest Saskatchewan. The highest populations are still located in the southwest, but a survey conducted by Agriculture and Agri-Food Canada and Saskatchewan Agriculture in July indicated economic infestations in other areas, and the presence of the weevil as far east as Regina and north to within 70 km of Saskatoon.

Monitoring for **diamondback moth** trapped a high number of moths near Avonlea in June. Although the traps are intended more as a warning than as an indicator of economic levels, some fields required control in the area. Diamondback moths were noted in a number of other areas where insecticide application was required (Wilkie, Rosetown, Kindersley and Lloydminster).

The fall 2007 survey of adult **grasshoppers** suggested the potential for severe (>12-24 hoppers per square metre) infestations in a few areas in south and west-central Saskatchewan. Although heavy infestations did not occur, there were reports of crops being sprayed in the Elrose, Rosetown and Outlook areas. Insecticide application occurred largely on lentil, in which the economic threshold is lowest; two hoppers and higher per square metre. The fall 2008 grasshopper survey is complete and the 2009 grasshopper forecast map will be available in January.

Wheat stem sawfly was at high levels in various locations across the province, particularly in northwest and central regions. Crop rotation and utilizing solid stemmed wheat varieties remain the only options for managing this pest. Early swathing of severely infested stands is the best method of salvaging wheat if high populations are noted.

Root maggots were widespread in the Parkland Region in 2008. Favourable (moist) soil conditions were conducive to maggot populations and most canola plants had one or more larvae tunneling in the root. On a large field scale, control options are not economically viable. Non-chemical strategies include heavier seeding rates and should be considered in the spring when planting.

Moist conditions are also favourable for the **wheat stem maggot**. Infestations were estimated at higher levels than normally seen in the Province. However, due to the highly visible white heads, observed estimates are generally higher than actual levels and there are no control options available.

Wheat midge infestations were forecast to be at unprecedented levels in 2008 and this was, no doubt, the most serious insect pest for producers. However, cool and very dry conditions resulted in a delay in emergence. Reports of the first emergence of midge were in locations in the east-central and northeast regions in early July, with the bulk of the female midge emerging about a week later than most years. Chemical application for control continued into the third week in July. Variable crop staging resulted in some of the earliest seeded wheat crops escaping damage.

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Insect Review of 2008
(Continued from page 11)

Various **aphid** species were noted and required control in a number of crops with pea, lentil and canary seed being the most affected. Aphids were also noted at higher levels in some cereal crops but even with the increased value in these crops, control was not required.

The annual **Bertha armyworm** monitoring program indicated a few areas with higher potential risk, based on adult moth counts. There was some spraying reported for Bertha armyworm larvae in the Prince Albert area and in the northeast (Nipawin), but overall, the outbreak experienced over the past few years appears to be on the decline. ☼

Seed-Borne Diseases at Harvest

By Faye Dokken, Provincial Specialist, Plant Diseases

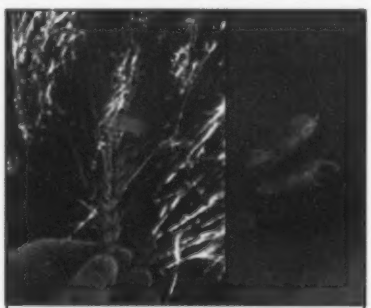

Figure 1: Ergot in 2008 durum harvest.
Source: Saskatchewan Agriculture

Our attention now turns from the field to the bin, where quality becomes the focus. No matter what the destination after harvest, seed quality will play an important role in determining its value and end-use suitability. Marketplace seed quality is characterized by grading factors that are designated by the Canadian Grain Commission, and is normally assessed at the elevator. Quality of seed destined for planting will be characterized by a different set of factors. Seed testing laboratories can help you determine germination and vigour, and can detect certain diseases. Seed testing is usually done in the fall or spring (sometimes both), depending on the producer's preference and reasons for having the seed tested. Some seed abnormalities and discolourations can be caused by pathogens or saprophytes, while others are simply a result of abiotic factors. The following are a few examples of common seed disease issues that may be noticed at harvest time.

Ergot

Cool, damp weather and uneven flowering favoured ergot in some areas of the province this year. *Claviceps purpurea* causes ergot on most cereals and grasses in Canada, and is a particularly important disease of rye. Infected heads are made evident by one or several dark purplish sclerotia protruding from the spike in place of normal kernels (Figure 1). Sclerotia are visible in grain and can usually be removed through commercial cleaning. Ergot is not tested for at seed testing labs, however, downgrading may occur at the elevator (thresholds for No. 1 wheat or barley is one ergot body per kg of seed). Toxic levels to livestock are 0.1 per cent ergot material or 10 ergot bodies per litre or one ergot body per 1,000 kernels. The *Ergot of Cereals and Grasses* factsheet is available at: www.agriculture.gov.sk.ca/Default.aspx?DN=d39a53a7-5a7d-4428-b8d2-d94975f8dcd6.

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Seed-Borne Diseases at Harvest

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Fusarium

Species of *Fusarium* can cause damage and discolouration to grain through disease infection or saprophytic growth. Production of sporodochia (cushion-like fruiting bodies) associated with fusarium head blight (FHB) on cereals appears as an intense red or orange discolouration that can be removed by scraping or rubbing the affected seed. In barley, FHB causes a darker discolouration of spikelets and kernels. In wheat and rye, FHB also results in the production of tombstone or scabby kernels (Figure 2), that may result in grade reductions. If heads were infected by *F. graminearum* or *F. culmorum,* seeds may also be contaminated with vomitoxins, making grain undesirable for certain end-uses.

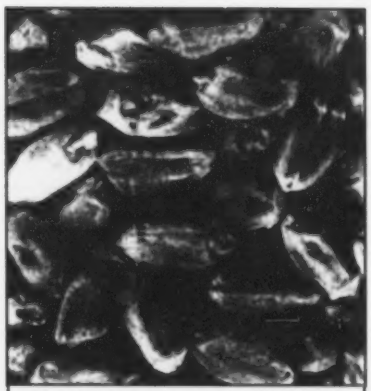

Figure 2: Fusarium head blight tombstone kernels.
Source: Saskatchewan Agriculture

Grain can be tested for vomitoxin levels to determine suitability for particular food, feed or malting purposes. Seed should be tested for germination and presence of *Fusarium* before re-planting, and use of a registered seed treatment may improve emergence and reduce seedling blight. Overgrowth of *Fusarium* in oilseeds and pulses can also cause white or pink to red discolouration on seeds. Note that pink seed may also be a result of bacterial contamination by *Erwinia* spp, affecting cereals, oilseeds or pulses.

Other Discolourations

There are several different fungi that can cause discolourations of cereal grains, often occurring as result of disease, delayed harvest, or improper storage conditions. Seed testing labs do not routinely test for these diseases.

An example of a common cereal seed discolouration is black point (smudge), usually caused by *Alternaria alternata, Cochliobolus sativus,* or *Pyrenophora tritici-repentis,* the latter which also causes red smudge on wheat kernels and tan spot on wheat leaves. Saprophytic fungi such as *Aspergillus* and *Penicillium* can cause dark discolurations and other seed quality issues during storage. In general, spoilage can be prevented by keeping grain dry and cool during storage and aerating the bin to balance grain temperature and reduce moisture migration.

Figure 3: *Botrytis* on chickpeas.
Source: Saskatchewan Agriculture

Pulse crops can be infected by species of *Ascochyta, Collectotrichum* (anthracnose), *Botrytis* (Figure 3), and *Stemphylium*, often resulting in grey, brown or yellow discolourations, and sometimes shrinkage of seed. Use of disease-free seed is the primary means to prevent introduction of pulse crop pathogens into fields and produce healthy seedlings.

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Seed-Borne Diseases at Harvest
(Continued from page 13)

Infected seed may not always be visually distinguishable from healthy seed; therefore, seed testing is particularly important when seed is destined for planting.

Smuts and Bunts
Loose smut is caused by different species of *Ustilago,* depending on the host (barley, oat or wheat). Loose smut causes infection during flowering but does not affect the appearance or quality of the developing seed. However, infected seed contains mycelium that has the potential to cause smutted heads the following season. Loose smut can be detected by seed testing laboratories and systemic seed treatments are effective. Covered and false loose smuts of barley, oats and related grasses are also caused by *Ustilago* species, whereas common bunt or stinking smut is caused by *Tilletia laevis* and *T. tritici.* Seed testing labs do not test for these diseases. Bunt affects wheat, rye, triticale and other grasses, and results in the replacement of developing kernels with spore-filled bunt balls. These spores are a source of infection in contaminated seed but may be controlled with a seed treatment. Resistant varieties are available for all forms of smut.

For more information on seed-borne disease issues, see the Saskatchewan Ministry of Agriculture publications, Guidelines for Seed-Borne Diseases of Cereal Crops and Guidelines for Seed-Borne Diseases of Pulse Crops. ☼

Canadian Fertilizer Institute Advisory

By Ken Panchuk, Provincial Specialist, Soils

With the current tight market conditions for fertilizer, it may be tempting for some individuals or companies to attempt to take advantage of customers looking for alternative sources of supply. Recently, the Canadian Fertilizer Institute issued reports of large quantities of fertilizer products being offered for sale at prices far below current market values. While these offers may be legitimate, we urge farmers and agri-retailers to be vigilant about potential fraud or misleading offers.

Customers should exercise due diligence in all transactions.

- Check the identity and reference of new suppliers;
- Seek the advice of a lawyer, financial institution or customs broker if you are unfamiliar with the terms;
- Ensure that all terms of any offer are clear and detailed;
- Contact the police if you are suspicious that an offer may be fraudulent; and
- Take steps to ensure you will receive the product that you book before completing payment.

For more information, phone Clyde Graham, Canadian Fertilizer Institute, at (613) 786-3033, or e-mail cgraham@cfi.ca. ☼

Upcoming Workshops

Mark Your Calendar for these Workshops: Certified Crop Adviser and Soils and Crops

By Faye Dokken, Provincial Specialist, Plant Diseases

Who? These events will be great learning opportunities for Certified Crop Advisers, Professional Agrologists, researchers, students and other members of the agriculture industry.

What? The annual Soils and Crops Workshop will be held in conjunction with a new Certified Crop Adviser training event.

When? Feb. 25-26, 2009.

Where? Western College of Veterinary Medicine Building, University of Saskatchewan, Saskatoon.

Why? In-depth training, professional development, networking and extension of current soils and crops research.

CERTIFIED CROP ADVISER

Pesticide Resistance Workshop – Feb. 25, 2009

- Understanding modes of actions of pesticides and how resistance develops.
- Three-and-a-half hours on herbicide resistance. Speakers include: Hugh Beckie, Agriculture and Agri-Food Canada (AAFC), Saskatoon; Eric Johnson, AAFC, Scott Research Station; Rick Holm, University of Saskatchewan, Saskatoon; Clark Brenzil, Provincial Specialist, Weeds, Saskatchewan Agriculture.
- Three-and-a-half hours on insect and disease resistance. Speakers include: Marjorie Smith, AAFC, Winnipeg; Bruce Gossen, AAFC, Saskatoon; Faye Dokken, Provincial Specialist, Plant Diseases, Saskatchewan Agriculture.

Soils and Crops Workshop

- Poster viewing session on Feb. 25, 2009, following the Pesticide Resistance Workshop.
- Workshop oral presentation sessions on Feb. 26, 2009.
- Watch for the *Call for Posters and Speakers* and registration details later this fall.☼

The ***Crop Production News*** is a publication of the
Crop Development Branch, Saskatchewan Ministry of Agriculture.
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